

## UTILITY PATENT APPLICATION

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Washington D.C. 20231

Case Docket No. 2038-202

Sir:

Transmitted herewith for filing is the patent application of:

INVENTOR: Rumi YAMAKI & Kenichi HISADA  
FOR: PULL-ON DISPOSABLE DIAPER

Enclosed are:

[X] 14 pages of specification, claims, abstract  
[X] Declaration & Power of Attorney.  
[X] Priority Claimed  
[X] 3 sheets of formal drawing.  
[ ] An assignment of the invention to \_\_\_\_\_  
and the assignment recordation fee.  
[X] Certified copy of Japanese Patent Application No. 8-294096  
[ ] An associate power of attorney.  
[ ] Information Disclosure Statement, Form PTO-1449 and reference.

The filing fee has been calculated as shown below:

(1) FOR	(2) NO. FILED	(3) NO. EXTRA	(4) RATE	(5) AMOUNT
TOTAL CLAIMS	4	-20	x \$22.00	\$ 0.00
INDEPENDENT CLAIMS	1	-3	x \$82.00	0.00
MULTIPLE DEPENDENT CLAIM(S) (If applicable)			+ \$270.00	00.00
			BASIC FEE	\$ 790.00
				_____
			Total of above calculations=	\$790.00
[ ] Assignment & Recording Fee				\$ .00
			TOTAL FEE	\$790.00

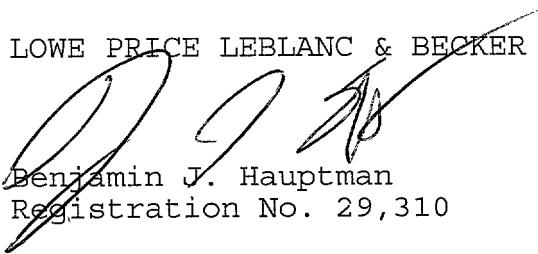
[X] Please charge my Deposit Account No. 12-2237 in the amount of  
\$ 790.00. A duplicate copy of this sheet is enclosed.  
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[X] The Commissioner is hereby authorized to charge payment of following fees during the pendency of this application or credit any overpayment to Deposit Account No. 12-2237. A duplicate copy of this sheet is enclosed.

[X] Any patent application processing fees under 37 CFR 1.17.  
[X] Any filing fees under 37 CFR 1.16 for presentation of extra claims.

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**Date:** November 6, 1997

## PULL-ON DISPOSABLE DIAPER

### BACKGROUND OF THE INVENTION

This invention relates generally to pull-on disposable diapers and the like.

Pull-on disposable diapers are well known. To improve a fitting of such diaper to the wearer's body, waist-opening and the leg-openings of the diaper have been provided in the proximity of their peripheral edges with elastic members bonded thereto in their longitudinally extended conditions. Body fluid absorbent core of the diaper is disposed between a liquid-permeable sheet and a liquid-impermeable sheet so as to extend across a crotch region from a front waist region into a rear waist region of the diaper. As viewed vertically of the diaper, longitudinally opposite ends of the absorbent core lying in the front and rear waist regions, respectively, underlie the elastic members associated with the waist-opening.

The pull-on diaper is apt to slip down more or less during use. While it is possible to pull up the pull-on diaper by holding an edge of the waist-opening, even such simple operation is often difficult for the aged and the sick. Although it is often relatively easy to pull up a

front side of the diaper, it is often difficult for the aged and sick to hold a rear side of the diaper with his or her hands and thereby to pull up the rear side. In such a case, that wearer' hips might be left exposed.

#### SUMMARY OF THE INVENTION

In view of the problem as has been described above, it is a principal object of the invention to provide a diaper so improved that unintentional exposure of the wearer's hip can be minimized even if the diaper more or less slips down.

The object set forth above is achieved, according to the invention, by a pull-on disposable diaper comprising an absorbent including a liquid-permeable topsheet, a liquid-impermeable backsheets and an absorbent core disposed therebetween, and having a front waist region, a rear waist region and a crotch region extending therebetween, and a waist-opening and a pair of leg-openings defined by said respective regions wherein said waist-opening and said leg-openings are provided with elastic members being stretchable circumferentially of said respective openings and bonded in longitudinally extended conditions thereof, said disposable diaper being characterized in that said elastic members associated with said waist-opening extend across said front

and rear waist regions substantially at the same level vertically of said diaper; and said absorbent core has a front end in said front waist region and a rear end in said rear waist region, said front end lies below said elastic members associated with the waist-opening and said absorbent core extending, in said rear waist region, upward beyond said elastic members associated with the waist-opening so that said absorbent core has a rear end lying above said elastic members associated with the waist-opening.

The pull-on disposable diaper according to the invention allows an unintentional exposure of the wearer's hip to be minimized since a depth of the rear waist region down to the crotch region is dimensioned so as to be significantly larger than that of the front waist region.

Other and further objects, features and advantages of the invention will appear more fully from the following description.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view showing an embodiment of a pull-on diaper according to the invention as partially broken away;

Fig. 2 is a plan view showing the diaper unfolded back

and forth from its state shown in Fig. 1, as partially broken away;

Fig. 3 is a sectional view taken along a line III-III in Fig. 2;

Fig. 4 is a sectional view taken along a line IV-IV in Fig. 2;

Fig. 5 is a sectional view taken along a line V-V in Fig. 2;

Fig. 6 is a view similar to Fig. 4 illustrating an alternative embodiment of the invention; and

Fig. 7 is a view similar to Fig. 5 illustrating the alternative embodiment of the invention.

#### DESCRIPTION OF THE PREFERRED EMBODIMENTS

A pull-on or shorts type disposable diaper shown by Fig. 1 in a perspective view as partially broken away basically comprises a supporter 1 in the form of shorts and an absorbent 2. The supporter 1 is composed of a front waist region 6, a rear waist region 7 and a crotch region 8 extending between the front and rear waist regions 6, 7. These front and rear waist regions 6, 7 are put flat and bonded together along their transversely opposite side edges at vertically intermittent spots 10 so as to form right and

left closed side edges 13 of the waist regions, a waist-opening 14 and a pair of leg-openings 16. The supporter 1 is made of a laminated sheet 19 comprising a liquid-impermeable plastic film serving as a topsheet 17 and an air-permeable spun-bond nonwoven fabric serving as a backsheet 18. The waist-opening 14 and the leg-openings 16 are respectively provided in the proximity of their peripheral edges with a plurality of elastic members 21, 22 which are stretchable circumferentially of their openings, respectively. These elastic members 21, 22 each having a width of 0.5 ~ 3mm are laid between the topsheet 17 and the backsheet 18 and bonded in their longitudinally extended conditions to an inner surface of at least one of the topsheet 17 and the backsheet 18. Referring to Fig. 1, the elastic members 21 associated with the front and rear waist regions 6, 7 extend across these waist regions 6, 7 substantially at the same level above the bottom of the crotch region 8. Below the elastic members 21, the front and rear waist regions 6, 7 are additionally provided with a plurality of second elastic members 23. These second elastic members 23 each having a relatively large width of 3 ~ 10mm are stretchable circumferentially of the waist regions and bonded in their longitudinally extended conditions to an inner surface of at least one of the

topsheet 17 and the backsheets 18. As shown, an upper end 27 of the rear waist region 7 sufficiently extends upward beyond the elastic members 21 to overlie an upper end 26 of the front waist region 6.

Fig. 2 is a plan view showing, as partially broken away, the diaper having the front and rear waist regions 6, 7 cut apart along the side edges 13 and longitudinally unfolded from the state shown in Fig. 1. Fig. 3 is a sectional view taken along a line III-III in Fig. 2 which divides the diaper in two longitudinally. As will be apparent from Fig. 2, the supporter 1 is substantially hourglass-shaped while the absorbent 2 is T-shaped and extends across the front and rear waist region 6, 7 and the crotch region 8 of the supporter 1. A front end 31 of the absorbent 2 lies in the front waist region 6 of the supporter 1 and terminates on this side of the elastic members 21. A rear end 32 which is transversely enlarged relative to the front end 31 lies in the rear waist region 7 and extends beyond the elastic members 21.

The absorbent 2 comprises a topsheet 36 made of a liquid-permeable spun-bond nonwoven fabric, a backsheets 37 made of a liquid-impermeable plastic film and a liquid-absorbent core 38 disposed between the topsheet 36 and the

backsheets 37 and comprising fluff pulp fibers or a mixture of fluff pulp fibers and super-water-absorptive polymer particles. The backsheet 37 is bonded to the topsheet 17 of the supporter 1 by means of hot melt adhesive (not shown). The absorbent 2 is provided along its transversely opposite side edges extending in the proximity of the crotch region 8 with a pair of barrier cuffs 39 extending longitudinally of the absorbent 2. Each of the barrier cuffs 39 comprises a liquid-impermeable strip extending longitudinally of the diaper, which has one side edge 41 bonded to the backsheet 37 and the other side edge 42 extending in parallel to the side edge 41 and folded inwardly of the diaper. Each side edge 43 of the topsheet 36 is bonded to the barrier cuff 39 along its area defined between the side edges 41, 42. The side edge 42 folded inwardly of the diaper contains an elastic member 44 bonded in its longitudinally extended condition to an inner surface of the folded side edge 42. An inner surface of the barrier cuff 39 is bonded at its longitudinally opposite ends 46, 47 (Fig. 2) to an upper surface of the topsheet 36 by means of hot melt adhesive (not shown). With the diaper being in the state shown by Fig. 1, the elastic member 44 contracts and, in consequence, an intermediate portion of the barrier cuff 39 extending between the longitudinally opposite

ends 46, 47 rises on the topsheet 36 so as to define a pocket which opens inwardly of the diaper. The absorbent core 38 has a plurality of parallel notches 51 extending forward (i.e., downward as viewed in Fig. 1) from a rear end 49 and these notches 51 allow the absorbent core 38 to be smoothly curved along the wearer's waist.

Figs. 4 and 5 are sectional views taken along lines IV-IV and V-V in Fig. 2, respectively. The topsheet 36 and the backsheets 37 covering the absorbent core 38 are bonded along their portions extending outward beyond a peripheral edge of the absorbent core 38 and placed upon each other. In the front waist region 6, the topsheet 17 and the backsheets 18 of the supporter 1 are folded along the front end 26 of the supporter 1 inwardly of the diaper and partially cover the absorbent 2. The topsheet 17 folded in this manner is bonded to the backsheets 18 folded together with the topsheet 17, on one hand, and bonded to the topsheet 36 of the absorbent 2, on the other hand (Fig. 4). In the rear waist region 7, the topsheet 17 and the backsheets 18 are folded along the rear end 49 of the absorbent core 38 inwardly of the diaper and bonded to the topsheet 36 (Fig. 5). The arrangement that both the front end 31 and the rear end 32 of the absorbent 2 are covered with the topsheet 17 and the backsheets 18 assures

that the wearer is free from an uncomfortable feeling of wetness even if body fluids spread to the front and rear ends 31, 32.

Figs. 6 and 7 are views similar to Figs. 4 and 5, respectively, showing still another alternative embodiment of the invention. Referring to Figs. 6 and 7, the topsheet 17 and the backsheet 18 of the supporter 1 longitudinally extend without being folded and the absorbent 2 merely rests on these topsheet 17 and the backsheet 18. Obviously, the absorbent 2 is bonded to the supporter 1 and the absorbent 2 might shift relative to the supporter 1. Arrangement illustrated by Figs. 6 and 7 is simpler than that illustrated by Figs. 4 and 5 and a manufacturing cost of the diaper can be correspondingly reduced.

It should be understood that the arrangements of the front waist region 6 illustrated by Figs. 4 and 6 and the arrangements of the rear waist region 7 illustrated by Figs. 5 and 7 may be selectively combined.

In the diaper configured as has been described herein above, the topsheet 17 and the backsheet 18 of the supporter 1 are not limited to those as illustrated and it is not critical whether they comprise liquid-permeable sheets or liquid-impermeable sheets. The topsheet 36 of the absorbent

2 also is not limited to the liquid-permeable nonwoven fabric and it is possible to replace this by a liquid-permeable plastic film. For implementation of the invention, bonding of various components such as the topsheet 17 and the backsheets 18 of the supporter 1 as well as the topsheet 36 and the backsheets 37 of the absorbent 2 may be achieved not only by use of suitable adhesive such as hot melt adhesive but also by use of the known heat-sealing technique so long as any one or more of these sheets are of heat-sealable nature.

While the invention has been described hereinabove in connection with the pull-on disposable diaper basically comprising the supporter 1 in the form of shorts and the absorbent 2, the invention may be implemented by using the liquid-permeable topsheet 17 and the liquid-impermeable backsheets 18 to form the supporter 1 in the form of shorts and by disposing the T-shaped absorbent core 38 between these two sheets 17, 18.

The entire disclosure of Japanese Patent Application No. Hei8-294096 filed on November 6, 1996 including specification, claims, drawings and abstract are incorporated herein by reference in its entirety.

Having described our invention as related to the

embodiment shown in the accompanying drawings, it is our intention that the invention be not limited by any of the details of description, unless otherwise specified, but rather be construed broadly within its spirit and scope as set out in the accompanying.

WHAT IS CLAIMED IS:

1. A pull-on disposable diaper comprising an absorbent including a liquid-permeable topsheet, a liquid-impermeable backsheet and an absorbent core disposed therebetween, and having a front waist region, a rear waist region and a crotch region extending therebetween, and a waist-opening and a pair of leg-openings defined by said respective regions wherein said waist-opening and said leg-openings are provided with elastic members being stretchable circumferentially of said respective openings and bonded thereto in longitudinally extended conditions thereof, said disposable diaper being characterized in that:

said elastic members associated with said waist-opening extend across said front and rear waist regions and said crotch regions substantially at the same level vertically of said diaper; and

said absorbent core has a front end in said front waist region and a rear end in said rear waist region, said front end lies below said elastic members associated with the waist-opening and said absorbent core extending, in said rear waist region, upward beyond said elastic members associated with the waist-opening so that said absorbent core has a rear

end lying above said elastic members associated with the waist-opening.

2. The diaper according to Claim 1, wherein, in said rear waist region, said rear end of said absorbent core lies above said elastic members associated with the waist-opening and a region extending in the proximity of said rear end are covered with a liquid-impermeable sheet.

3. The diaper according to Claim 1, wherein said absorbent core has a plurality of notches extending downward in parallel one to another with said rear end.

4. The diaper according to Claims 1, wherein said absorbent is bonded to an inner surface of a shorts-shaped member having said front and rear waist regions and said crotch region.

A B S T R A C T

A pull-on disposable diaper has front and rear waist regions and a crotch region extending therebetween. A waist-opening of the diaper is provided with elastic members being stretchable circumferentially of the waist-opening. An absorbent core has a front end lying below the elastic members and a rear end extending beyond the elastic members so as to overlie them.

Docket No.: \_\_\_\_\_

## DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter claimed and for which a patent is sought on the invention entitled \_\_\_\_\_  
"PULL-ON DISPOSABLE DIAPER" \_\_\_\_\_, the specification of which

is attached hereto [ ] was filed on \_\_\_\_\_ as Application Serial No. \_\_\_\_\_ and was amended on  
\_\_\_\_\_ (if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is known to me to be material to patentability in accordance with Title 37, Code of Federal Regulations, Section 1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s):			Priority Claimed	
<u>Number</u>	<u>Country</u>	<u>Day/Month/Year filed</u>	<u>Yes</u>	<u>No</u>
8-294096	Japan	06/11/1996	X	

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Section 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

Prior U. S. Application(s):	<u>Filing Date</u>	<u>Status: Patented, Pending, Abandoned</u>
<u>Serial No.</u>		

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

I hereby appoint the following attorney(s) and/or agent(s): Allan M. Lowe, Reg. No. 19,641; Robert L. Price, Reg. No. 22,685; Stephen A. Becker, Reg. No. 26,527; Robert E. LeBlanc, Reg. No. 17,219; Israel Gopstein, Reg. No. 27,333; Benjamin J. Hauptman, Reg. No. 29,310; Kenneth E. Krosin, Reg. No. 25,735; Frank P. Presta, Reg. No. 19,828; Gilberto M. Villacorta, Reg. No. 34,038; Gene Z. Robinson, Reg. No. 33,351; Chittaranjan N. Nirmel, Reg. No. 30,408; Keith E. George, Reg. No. 34,111; Christopher W. Brody, Reg. No. 33,613; Arthur J. Steiner, Reg. No. 26,106; Edward J. Wise, Reg. No. 34,523; Alfred A. Stadnicki, Reg. No. 30,226; David L. Stewart, Reg. No. 37,578; John A. Hankins, Reg. No. 32,029; Brian D. Hickman, Reg. No. 35,894; Demetra J. Mills, Reg. No. 34,506; Alexander Yampolsky, Reg. No. 36,324; Timothy R. DeWitt, Reg. No. 35,857; William H. Beha, Reg. No. 38,038; Irah H. Donner, Reg. No. 35,120; Eric J. Kraus, Reg. No. 36,190; Leon R. Turkevich, Reg. No. 34,035; Mark G. Toohey, Reg. No. 35,392; Michael E. McCabe, Jr., Reg. No. 37,182; Edward A. Becker, Reg. No. 37,777; Kenneth M. Berner, Reg. No. 37,093; James H. Meadows, Reg. No. 33,965; and Stephen C. Carlson, Reg. No. 39,929. all of

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with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith, and all future correspondence should be addressed to them.

\*\*\*\*\*  
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Inventor's signature: 久田健一

Date: 29/9/1997

Residence: Ehime-ken, Japan

Citizenship: Japan

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\*\*\*\*\*  
Full name of third joint inventor:

Inventor's signature:

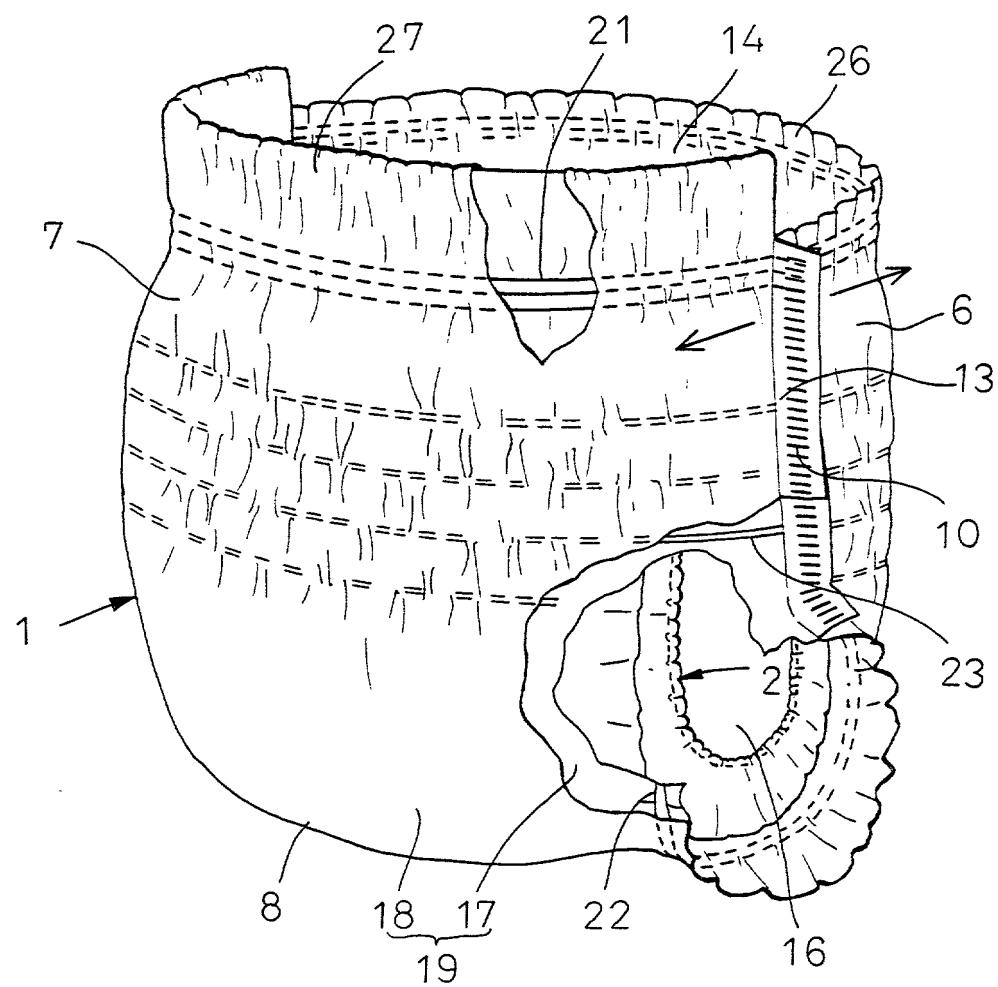
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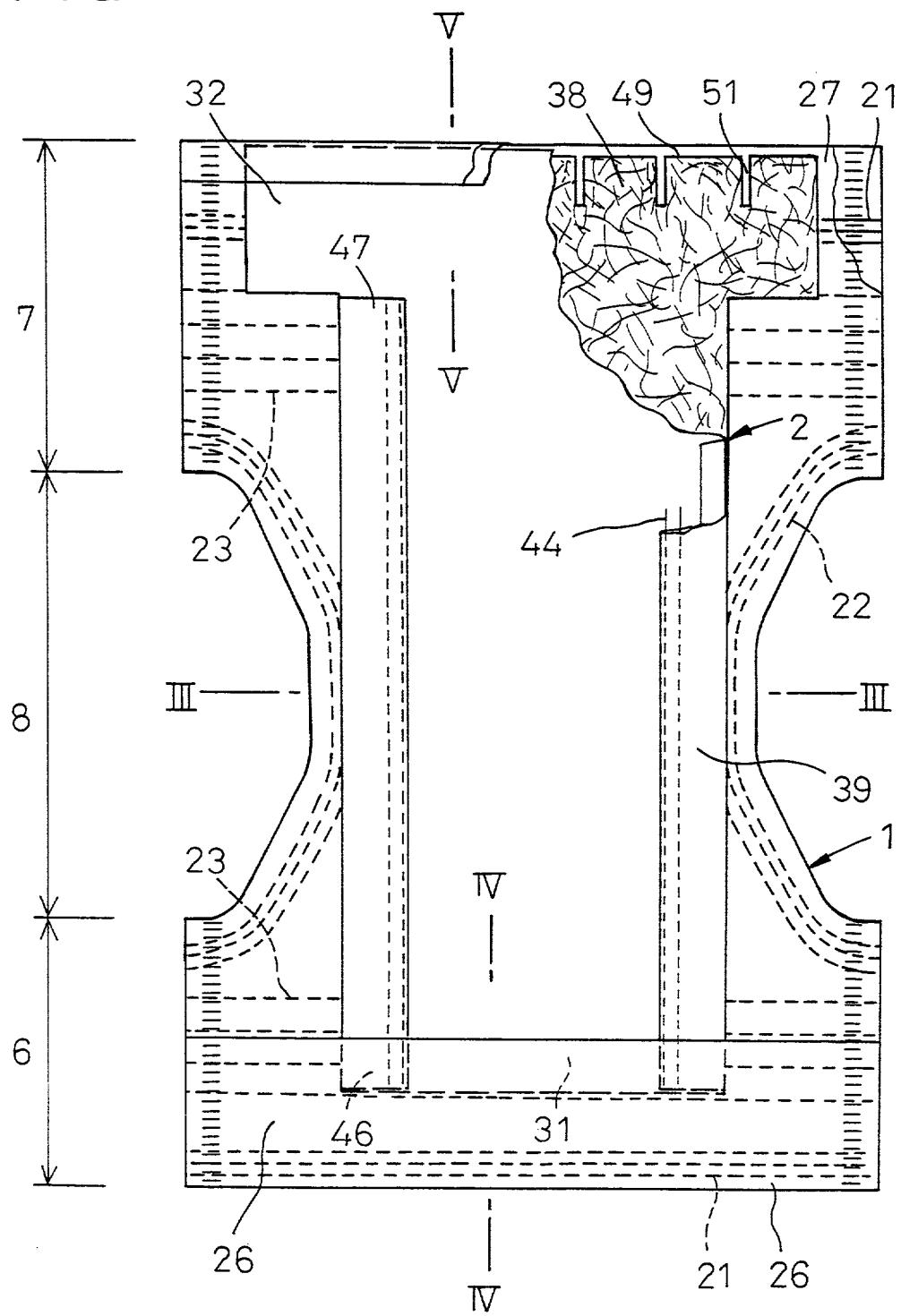
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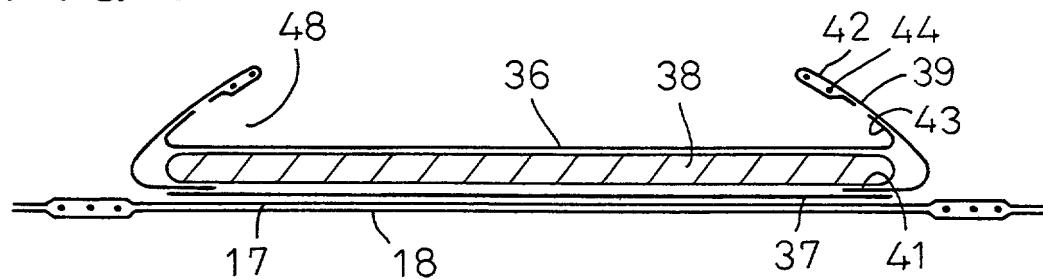
FIG. I



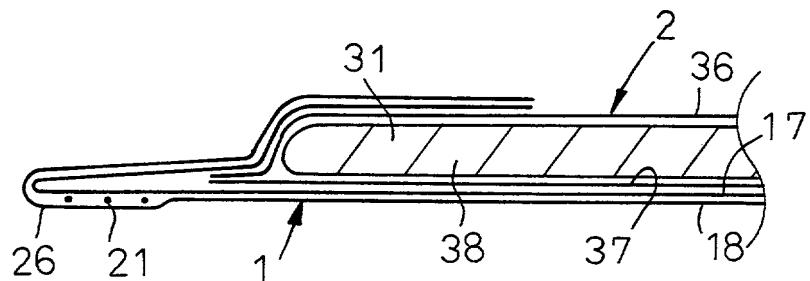
# FIG.2



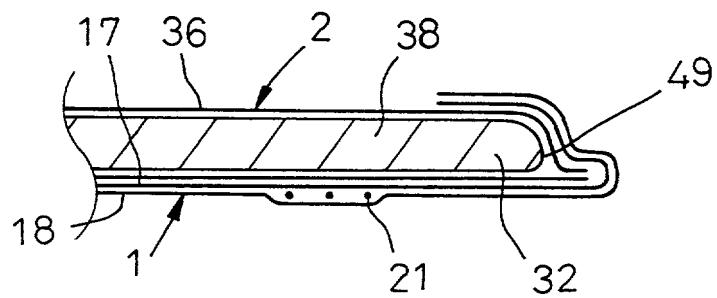
**FIG.3**



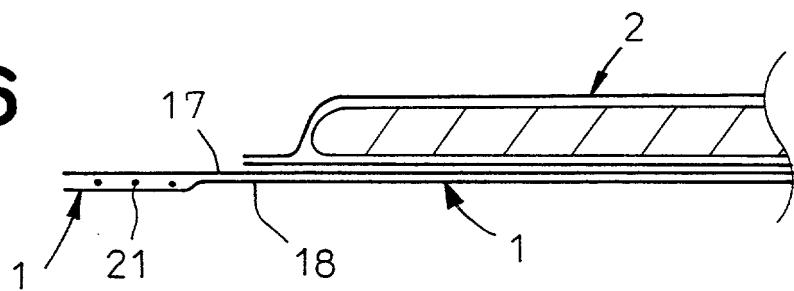
**FIG.4**



**FIG.5**



**FIG.6**



**FIG.7**

